Governance, Policy, and Procedures for Management of the Wyoming Integrated Statewide Education Data System

Prepared for the

Wyoming Department of Education

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Overview

The complexity of the Wyoming Integrated Statewide Education Data System (WISE Data System) requires a carefully designed governance mechanism. This document describes a set of operating procedures for the model system recommended from the WISE Data System study process. The boundaries between districts' and the State's responsibilities will be described. An initial set of operational policies and procedures are proposed. Recommendations for the on-going operation of the system were compiled from best practices across all states.

Recommended Steps

The following steps are recommended for management of the Wyoming Integrated Statewide Education Data System.

A. Pre-Implementation Phase

1. Create the WISE Data System Standards and Policy Advisory Group to meet bi-monthly to review policy issues and standards, and to make recommendations to WDE for adoption or submission to the legislative process as appropriate. This group should include broad representation of high-level people with policy expertise such as representatives from the districts, schools, the Legislature, WDE, a professional educator association, and other agencies. This policy group should provide guidance for how dollars will be distributed to districts and to consortia for implementation. The Standards and System Policy Advisory Group should adopt a charter for the WISE Data System and establish both short-term and long-term goals and objectives.
2. Create the WISE Data System Technical Advisory Group to meet as needed to review and make recommendations for implementation issues, such as timelines, priorities, targeted assistance to trailing districts, coordination of the consortia, and compliance with policies

and standards. This group should be an extension of the Design Team. The members need to have a practical understanding of how the schools and districts conduct their business. This group should create subgroups as needed to resolve specific issues and make recommendations to the group. This group should create user groups as appropriate to keep all users involved in the process. This group should manage the SIF objects and SIF certification issues, and create a process for defining objects not in SIF.

3. Create an internal WDE WISE Data System Coordination Team to meet monthly to ensure that current collections are phased into WISE Data System smoothly and to ensure that all appropriate information needs are met by the WISE Data System. Both technical and special program staff should be represented.
4. Hire required WDE staff or contractors. Create a WISE Data System web site resource for accessing all documents, references, communications, and schedules.
5. Manage the process for legislative action, issuance of requests for proposals, selection of vendors, and communications with stakeholders.
6. Create the final WISE Data System design and specifications with the contracted vendor. Finalize business rules for data validation. Establish the reporting/submission timeline.
7. Participate in SIF meetings and partner with other states to submit new state reporting objects and elements to be added to existing objects.
8. Finalize individual district plans based upon budget and timelines adopted. Compose the consortia based upon technical services and shared software applications.
9. Create the consortia sites and infrastructure.

B. Implementation Phase (varies by information area)

1. Contract with an oversight consultant to monitor the technical aspects of final design and implementation.
2. The WISE Data System Technical Advisory Group meets as needed to review and make recommendations for implementation issues, such as timelines, priorities, and compliance with policies and standards.
3. WDE WISE Data System Coordination Team meets to ensure that current collections are phased into the WISE Data System smoothly and to ensure that all appropriate information needs are met by the WISE Data System.
4. WDE WISE Data System staff manages the processes for implementation and communications with stakeholders.
5. Participate in SIF meetings to ensure adopted objects meet Wyoming's needs.
6. Establish and conduct early adopter and pilot implementations.

7. Transition from web reports to the WISE Data System SIF submissions as the contractor delivers the system components.
8. Evaluate the success of early implementation across districts to make modifications for on-going processes.

C. Maintenance Phase (varies by information area)

1. WDE WISE Data System staff manages on-going contracts, Central Data Manager updates, and needs for upgrades across district software applications.
2. Participate in SIF meetings to ensure adopted objects meet Wyoming's needs.
3. Update individual district plans to monitor progress.
4. Continue the active involvement of the advisory groups.

These steps are based upon a review of best practices across states for managing their state-level information systems. Regardless of the model and standards adopted within each state, there are over-riding processes that ensure success.

Major Contracts

There are four major contracts that will be needed for the WISE Data System.

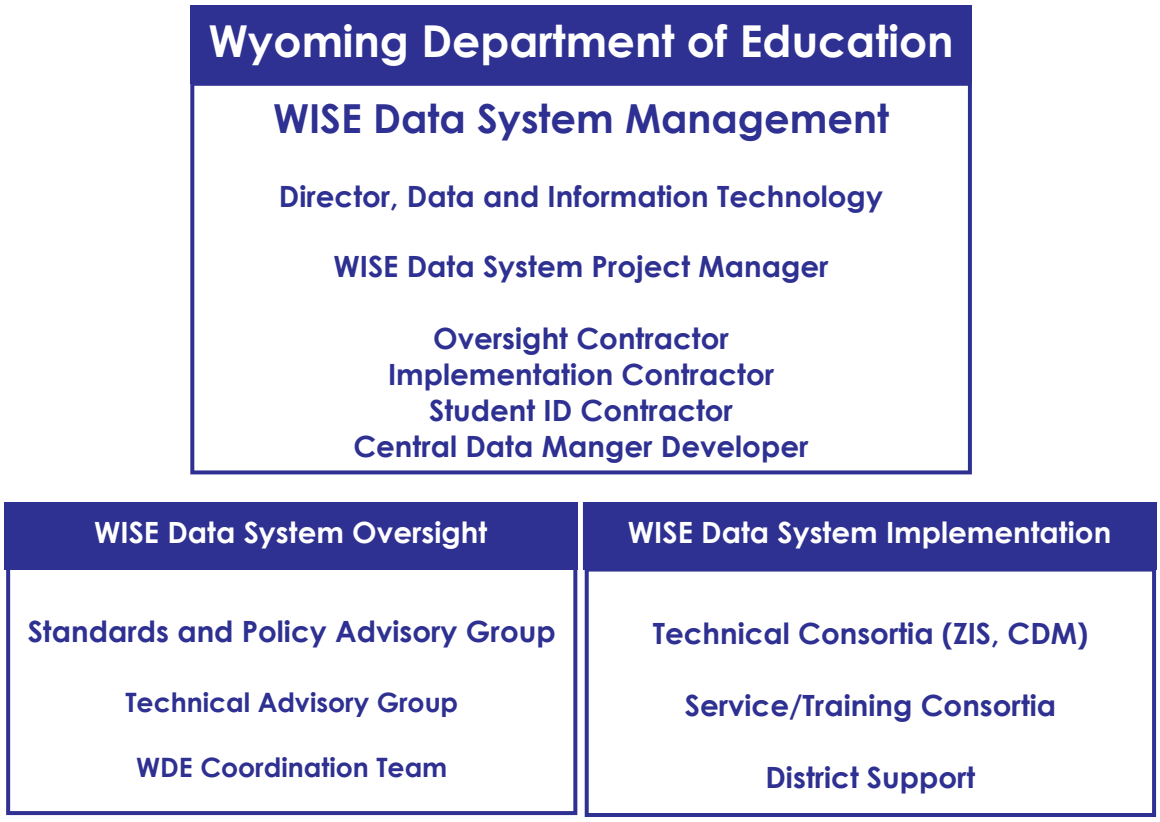
1. Oversight: Expertise for ensuring that the main implementation contract and work flow are on target and producing appropriate results

2. Student Identifier: Application and implementation support for assigning student identifiers to all Wyoming students and providing an on-going student locator function

3. Central Data Manager: Application to provide the function defined for the central data manger to translate SIF objects from districts into the elements as required for WDE's database

4. Implementation and Integration: The major task of implementing the WISE Data System components and ensuring the integration of all components of the system

A high-level representation of the entities that work together to create, implement, and manage the WISE Data System is provided below.

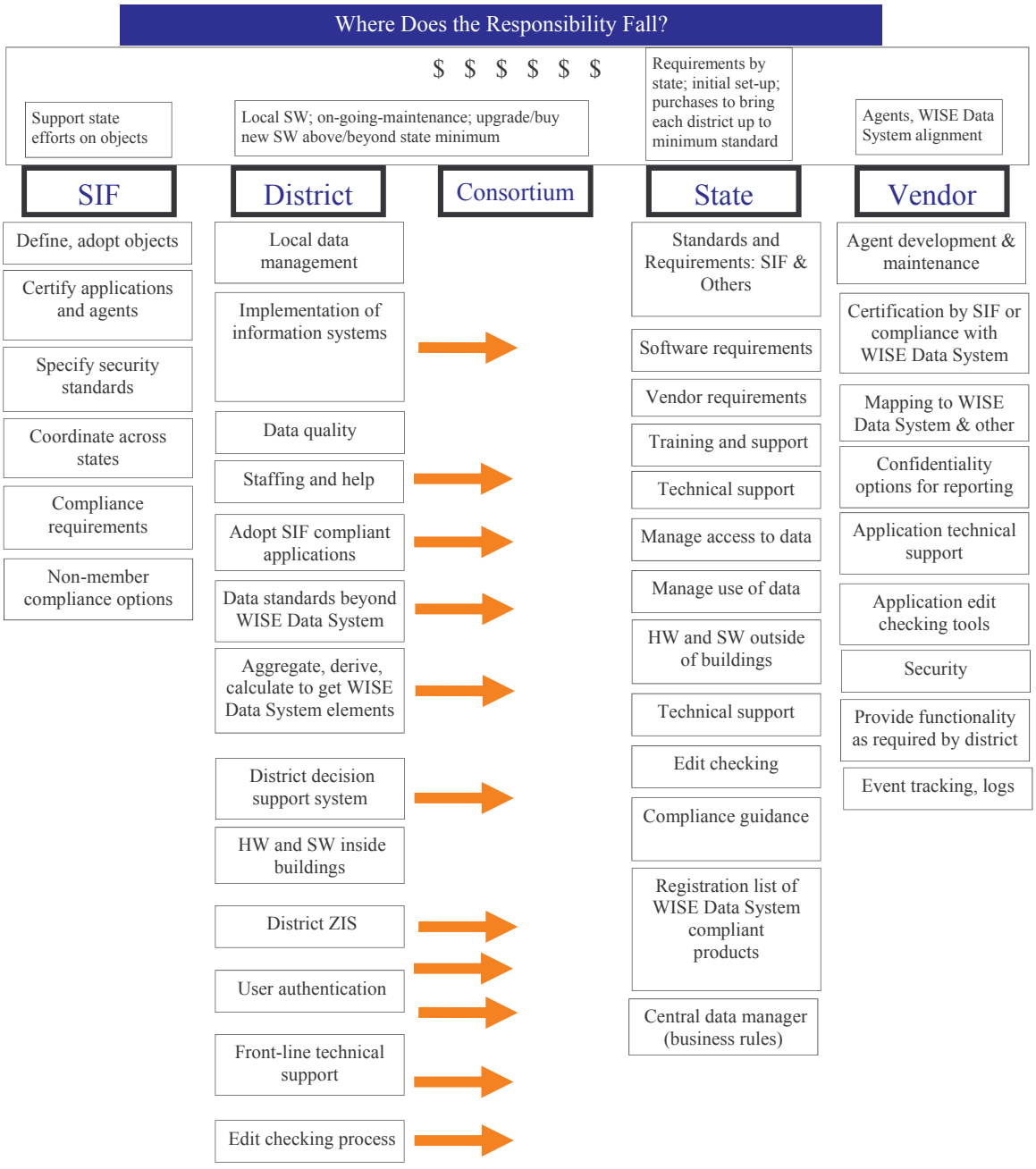


Areas of Responsibility

Several key entities share areas of responsibility related to the WISE Data System.

1. Schools Interoperability Framework Organization
2. School Districts
3. Consortia
4. Wyoming Department of Education
5. Software Vendors

The following chart provides a high-level view of how the responsibilities align with these entities.


Where Does the Responsibility Fall?
$ $ $ $ $ $
Support state efforts on objects
Local SW; on-going-maintenance; upgrade/buy new SW above/beyond state minimum
Requirements by state; initial set-up; purchases to bring each district up to minimum standard
Agents, WISE Data System alignment
SIF
District
Consortium
State
Vendor
Define, adopt objects
Certify applications and agents
Specify security standards
Coordinate across states
Compliance requirements
Non-member compliance options
Local data management
Implementation of information systems
Data quality
Staffing and help
Adopt SIF compliant applications
Data standards beyond WISE Data System
Aggregate, derive, calculate to get WISE Data System elements
District decision support system
HW and SW inside buildings
District ZIS
User authentication
Front-line technical support
Edit checking process
Standards and Requirements: SIF & Others
Software requirements
Vendor requirements
Training and support
Technical support
Manage access to data
Manage use of data
HW and SW outside of buildings
Technical support
Edit checking
Compliance guidance
Registration list of WISE Data System compliant products
Central data manager (business rules)
Agent development & maintenance
Certification by SIF or compliance with WISE Data System
Mapping to WISE Data System & other
Confidentiality options for reporting
Application technical support
Application edit checking tools
Security
Provide functionality as required by district
Event tracking, logs

Description of Responsibilities:

Schools Interoperability Framework Organization

Generally, SIF is responsible for building and maintaining the standard, so WDE and vendors have a clear reference for expectations and performance. SIF should also support state efforts to build objects that meet their needs.

1. Define and adopt objects within the SIF specification that include the data elements required for the WISE Data System; or provide user-defined alternatives that can be certified
2. Certify applications and agents that pass tests for compliance with adopted objects
3. Specify security standards to ensure that the SIF/ZIS data transmissions within zones are secure
4. Coordinate across states to maximize the utility of adopted objects and increase usage nationwide
5. Provide for sub-certification compliance to allow vendors needing Wyoming adoption to do so without undue expenses
6. Provide for non-member compliance options for vendors not choosing to join SIF as a member

School Districts

Generally, districts are responsible for local hardware and software acquisition, maintenance, upgrades and purchases beyond the minimum required or funded by the State.

1. Local data management on an on-going basis
2. Implementation of information systems in schools and district offices
3. Data quality during collection, storage, and reporting
4. Staff and support for staff
5. Adoption of only SIF compliant applications
6. Data standards that are beyond WISE Data System
7. Aggregation, derivation, and calculation of WISE Data System elements
8. District decision support system
9. Hardware and software inside their buildings
10. District ZIS
11. User authentications
12. Front-line technical support
13. Edit checking processes

Consortia

Generally, consortia are responsible for any tasks that are delegated to them from the member districts.

Wyoming Department of Education

Generally, WDE is responsible for establishing WISE Data System requirements, initial set-up tasks, and purchases to bring each district up to an established minimum level of functionality.

1. Standards and requirements including SIF
2. Software requirements for each information area
3. Vendor requirements for supporting WISE Data System
4. Training and support for district staff
5. Technical support for districts and consortia
6. Managing access to data within WISE Data System
7. Managing use of data within WISE Data System
8. Hardware and software outside of school and district buildings
9. Technical support for districts and consortia
10. Edit checking processes for the Central Data Manager
11. Business rules for the Central Data Manager
12. Defining sub-certification processes beyond SIF for vendors
13. Registration list of WISE Data System compliant products

Software Vendors

Generally, the software vendors are responsible for providing districts with products that meet the requirements for WISE Data System.

1. Development and maintenance of SIF agents
2. Certification by SIF or compliance with WISE Data System standards
3. Mapping to WISE Data System and other applications within the SIF /ZIS zones
4. Confidentiality options for reporting (producing reports that mask data appropriately)
5. Technical support for their applications
6. Edit checking tools for their applications
7. Security for their applications
8. Functionality of their applications as required by WISE Data System and districts
9. Event tracking and logs to provide an audit trail

SIF Certification Issues

SIF certification may be a challenge for vendors. In some cases, Wyoming may adopt a standard for an object that does not have SIF adoption and is not a part of the formal SIF certification process.

Wyoming should require vendors and their software to be "certified as compliant with SIF standards."

If SIF does not offer compliance testing and certification for an object that WDE has adopted for the WISE Data System, then the vendors' applications must be "compliant with the requirements for the WISE Data System." WDE will publish the compliance requirements, but will not certify vendors or applications. Compliance will be tested when data are submitted to the Central Data Manager. Objects submitted must pass the edits of the Central Data Manager to be accepted.

The WISE Data System Technical Advisory Group should establish the requirements and process for this acceptance and for passing edits.

Introduction to Best Practice

Best practice can be an elusive term. In Wyoming's schools, best instructional practice must be defined within the context of the school's students, resources, and goals. What works well in one school may not in another. This same reality applies to the management of data within state education agencies. Simply put, best practice for education data management is defined here as a combination of what state education agencies (SEAs) are doing with success and what they believe to be even better practices that they would follow if they could. For the Wyoming Department of Education (WDE), these best practices are not presented as absolute recommendations for action. Not all the practices described will be practical or appropriate for WDE. This document has been created as a reference, as background for the decisions WDE will make regarding the governance practices that best fit their organization.

The objectives of this task were to:

- Research and document best practice methods for managing education data.
- Describe how WDE can manage the WISE Data System for success.

The processes and governance practices eventually adopted by WDE will not be a copy of any other state's design. The solution for Wyoming is not out there in another state. In reality, no state is implementing all of the best practices summarized here.

Some of the best practices are risk-avoidance techniques. They work to prevent problems, useless data, over-burdening of data providers, loss of files, dissatisfaction of users, etc. In mature information environments such as Florida's, the experience of the staff and the well-tuned functioning of the processes can become a disincentive to manage those processes very closely. Staff exercise their judgment rather than refer users to a formal process.

Some of the best practices are valued-added techniques. They work to extract as much return on the investments in dollars and effort as possible. In newer environments where all components are not yet functional, providing value to the data providers is an excellent way to earn their support, cooperation, and quality data.

Some of the best practices are efficiency techniques. They work to reduce costs and time. In any environment, these are the data management processes that ensure success.

Some of the best practices are policy and compliance techniques. These ensure that laws are followed and confidentiality is protected. In any environment, these are the data management processes that raise the odds for survival.

The best practices represent the perspective that an investment in planning and design up front can save time and waste in the end. This is not a difficult concept to sell, but is a difficult one to buy. In other words, most people will agree in concept, but will the money and time be provided?

Max Yield Data

Max Yield Data are considered to be worth the effort and cost by everyone along their supply chain and within their use community. **Max Yield Data** have been standardized, collected, and presented such that the maximum use can be made of them.

Reference:

- *Max Yield Data for Education*

Uniqueness of Education Data

ESP's work with education agencies has convinced us that education data are indeed different from the data typically encountered in the business world. Education data and the systems that use them are atypical in many crucial aspects from standard business applications. Every enterprise thinks of itself as unique. However, in the education enterprise, the uniqueness presents distinct challenges that are not typically anticipated in data management tools and general business software applications. First and foremost is the fact that education deals with human beings, not products to be sold. Second, the measures we make of these humans are complex, subjective, and numerous.

Some examples that make education data distinctive are:

- Human factors such as changing demographics and behavior
- Confidentiality mandates that require management of small cell sizes
- A preponderance of missing data that must be identified as missing, zero, blank, or null for proper analysis and migration from one file to another
- Special conditions that require special handling and interpretation (e.g., testing conditions)
- Numerous pieces of data of a wide variety
- Numerous areas of data that must be related to each other

- Infrequent, imprecise rules and controls that allow poor data to pass through the system
- People not trained for data processing who have the responsibility for processing data
- Data that begin at the granular level and move up with the requirement that tools must aggregate and disaggregate appropriately
- Data often collected as aggregates; therefore totals may not add up
- Business rules that are not universally known and respected, nor are they monitored by the provider
- Little documentation of the real way business is done
- Lax controls, audit, and evaluation standards
- High number of exceptions within the data
- Unfamiliarity with education by the data processing people
- Lack of documentation for exceptions to their business rules
- Imprecise codes
- Loose data standards within and across entities

Individual state education agencies have addressed these issues in their own ways and are at different stages of solving many of them. WDE has well documented data standards, web-based collections with validation of data submissions, and a database for maintaining and accessing the data once collected.

From the Association for Information Management Professionals (AIMP) comes a useful perspective.

> How organizations manage information for competitive advantage is dramatically changing as a result of such trends as:
>
> - Globalization of the market economy, the driving force of which is technology
> - E-commerce, which is creating new dimensions and concerns for information privacy and security
> - Organizational change, resulting from increased outsourcing, business partnerships, and modular relationships
>
> Issues such as what information will be shared and with whom are critical to the future success of 21st century organizations. The greatest challenge is the need to better manage the information flow being created for these new

> organizations and relationships. This is the role of--and the opportunity that awaits--the information management professional.
>
> Information management professionals must understand and effectively manage information from its conception, including its role in the organization's ability to meet its strategic goals. They must be able to manage information strategically, tying back to the organization's core mission.
>
> Today's information management professionals must possess content skills, an understanding of how and why data is created, who should have access to it, and when it should be destroyed. Further, they must be able to address these and other issues resulting from emerging business trends at the strategic level as business relationships and processes are being developed. This requires skills, knowledge, and perspective that integrate the tactical and strategic aspects of information and records management, information technology, and executive management.
>
> Intellectual capital drives the bottom line. The biggest profits will go to those that manage information; not physical assets. Therefore, organizations and professionals who embrace information management as being strategic and mission critical will ensure their competitive advantage.

With apologies to educators who have grown weary of business practices being cited as models for education, this quote provides support for the importance for WDE to develop and implement an effective data policy and management plan.

The AIMP description goes on to distinguish information systems as:

> …an arrangement of people, data, processes, interfaces, network(s), and technology that interact to support and improve day-to-day operations in a business, support the problem-solving and decision-making needs of management.

The information system should be defined very broadly to encompass all the parts and players that influence information within the schools, districts, and WDE. Information management should be defined as the policies and processes that make the information within the system useful. Neither one can be completely described without the other.

Methodology

The authors have worked over the last decade with state education agencies and their information systems. We have facilitated regional and national meetings on best practice for education information collection, management, and reporting. Over that time, the set of reference documents cited in this paper has been created.

References:

- *Background Paper on Ideal Education Information for Improving Classroom Practice*
- *National Meetings Summary for Ideal Education Information*
- *Current Use of Decision Support Systems in Education*
- *State Consortium on Statewide Student Information Systems Notes*
- *Recommendations from the National Meetings on Ideal Information Systems*
- *Notes from the First National Meeting on Ideal Information*
- *Comments by Dr. Floraline Stevens on Ideal Information*
- *Notes from the Wilmington Meeting on Ideal Information*
- *Education Associations Meeting Notes*

For our work with other states, ESP reviewed the characteristics of other SEAs and selected three as representing best practice. These were chosen because they have working information systems in various stages of maturity, but each is the core source of the SEA's information. ESP conducted interviews and visited each during the development of the Performance Based Data Management Initiative project for the U.S. Department of Education. The states selected and interviewed were:

- Florida—recognized as the first comprehensive, statewide, automated education information system
- Massachusetts—recognized for applying proven business practices to the automation of data systems in a state known for local control and a history of late reporting
- Mississippi—recognized for successfully building an ambitious automated system to consolidate data collection and reporting in a state without a widespread technology infrastructure in the schools

These states vary in the age of their systems and the management styles of their governments, but they share a common vision: to manage the burden of data collection by consolidating collections, and to improve the use of data by effectively managing the data collected. In all three states, a central data resource has been built within which data are managed to meet the information needs of policy makers, program managers, and the public.

ESP also reviewed the on-going efforts of the U.S. Department of Education (USED) as they implement data management processes in response to congressional mandates for improvements in data quality and availability.

Lessons from USED's Efforts

USED has adopted these principles for data management.

U.S. Department of Education: Data Architecture Principles

- Data will be entered once, and only once, as close to its source as possible.
- Data are a departmental asset and do not belong to any particular office, program, or individual.
- All users requiring the services of data processing resources (hardware, software, and data) will share these resources.
- Department data will conform to a standardized set of data elements and definitions.

Supportive Practices:

- An authoritative data source is identified for each data element or statistic.
- Authoritative data are accessible by all authorized users.
- Data from the authoritative data source are used in lieu of duplicate collections.

From our work with USED and the states, we have concluded that there are three general truths about education data.

- Most education data begin at the school level.
- Many of those data are passed along to the state education agency.
- Most education data ultimately arrive at the U.S. Department of Education (USED).

When state-level educators and other professionals are asked what percentage of their data is collected to meet a federal mandate, estimates have ranged from a low of 25% to a high of 90%, with the great majority being around 75-80%. What if all federal mandates disappeared? States and districts would continue to collect much of this information for themselves. What these estimates illustrate is

that the majority of the education information collected from schools is influenced by federal mandates because it is ultimately reported to a national level.

The significance of these truths is that the USED drives the definitions, the periodicities, and the availability of most of our education data. However, the USED relies upon the efforts of state education agencies, which in turn rely upon the conscientiousness, accuracy, and cooperation of teachers, principals, and school secretaries to get the data. Therefore, for state education agencies to design, select, or manage data successfully, they must balance the realities of a school with the requirements of the USED.

The USED, under the leadership of their Chief Information Officer Craig Luigart, moved forward with a comprehensive effort to improve education data quality and timeliness through automation and the support of standards. The Office of Management and Budget (OMB) requested that USED build a business case for improving data quality and availability through coordinated standards and processes. This business case reflects the education legislation from Congress. This business case uses technology, but features strong data standards because technology is no longer the weak link in the chain of reporting education data across levels. The weak link today is compatibility of data across everyone's information systems.

Each state should monitor the progress of USED's Performance Based Data Management Initiative (PBDMI) as it grows to automate and consolidate USED data collections. The Education Data Exchange Network (EDEN) is USED's data warehouse and data access project.

Reference:

- *Our Partnership Path, Arthur Graham*

Summary of Best Practice for Data Management

From the review of the best-practice states, our work with USED, and our prior work with states, we have summarized and organized the 16 characteristics identified as best practice for data management. Where specific references apply, they are provided within the text. Each one is associated with the questions that a state must address and answer when designing its data management processes. Each question is followed by a statement describing what exemplifies best practice. These questions, and certainly the sample answers, are not presented as a blueprint for data management. However, from these, Wyoming can build its own custom blueprint with the assurance that the interests of schools, districts, state-level decision makers, the public, and other data providers and users are considered.

The summary is formatted into several parts as described below. This description uses the same headers and formatting style as in the summary that follows.

- **Characteristic:** The name of the characteristic from "Best Practice for Data Management within a State Education Agency." These characteristics represent successful data management practices. Each is described by the question that must be answered during the planning and design phases for a data architecture and an implementation plan for data management. A data management benchmark is described for each question as a starting point for planning. The characteristics described are:

    1. Oversight
    2. Management
    3. Organizational practices, mandates, and policy
    4. Data standards
    5. Content
    6. Data quality
    7. Support
    8. Resources
    9. Response to change
    10. Output and products
    11. Response to *ad hoc* demands
    12. Confidentiality and security
    13. Data exchange and access
    14. User engagement
    15. Data storage
    16. Infrastructure

- **A brief statement of the characteristic**

- ***Best Practice State(s):*** From the interviews and descriptions of the three best-practice states, the summary identifies the one(s) exemplifying this characteristic.

- *Links to Comprehensive Education Information System Requirements and No Child Left Behind:* Listing of components "Characteristics of a Comprehensive Education Information System for a State Education Agency." The components are those identified by ESP for states as being necessary or recommended for meeting the requirements of No Child Left Behind. Benchmarks at three levels of implementation are described (missing, interim, and target). These characteristics provide a broad context for data management activities.

  Where there is a specific requirement in No Child Left Behind (NCLB), that is noted in parentheses. The characteristics not specifically attributable to NCLB are noted as management efficiency requirements, meaning that they are components that, in ESP's opinion, must be in place to facilitate data management.

  1. **Academic Standards** (NCLB Requirement: Reading/Language Arts, Mathematics, and by 2005-2006 Science)
  2. **Student Performance Measures** (NCLB Requirement: Reading & Math 3-8; by 2007-2008 Science elementary, middle, & high school)
  3. **Actionable Accountability Reports** (NCLB Requirement: State, District & School Annual Report Cards by beginning of 2002-2003 school year)
  4. **Actionable Diagnostic Reports** (NCLB Requirement: Assessment reports to schools prior to school year)
  5. **Automated Data Collection Systems** (Management Efficiency Requirement)
  6. **Data Standards** (Management Efficiency Requirement; USED Standards Provided for Reporting)
  7. **Linkable Individual Student Records** (NCLB: Optional Methodology)
  8. **Longitudinal Data Points** (NCLB Requirement: Two-year trends for assessments in report cards)
  9. **Course Data** (Management Efficiency Requirement; NCLB: "Highly qualified teachers" by class; optional class size reporting)
  10. **Program Participation Data** (NCLB Requirement: Migrant, IEP, LEP assessment performance)

11. **Enrollment Data** (NCLB Requirement: Graduation, inclusion in assessments; promotion/retention optional)
12. **Background and Demographic Data** (NCLB Requirement: Subgroups reporting for assessments and AYP)
13. **Staff Data** (NCLB: "Highly qualified" teachers reporting)
14. **Financial Data** (NCLB Requirement: Grant accountability, maintenance of effort)
15. **Authority to Access Data and Reports** (NCLB: Protection of personally identifiable data)
16. **Electronic Exchange of Student Records** (Management Efficiency Requirement; Value-Added Benefit)
17. **Network Connectivity** (Management Efficiency Requirement)

- **Questions to Answer During the Planning and Design Phases:** For each characteristic, some of the basic questions that the WDE must address are stated.

- **Data Management Benchmark:** For each question, a best practice response is provided.

- Discussion: Comments on how the information relates to WDE.

- *References*: Throughout the document, the references are inserted where they apply.

Characteristics of Best Practice for Data Management

Characteristic: Oversight

How principles and policies are determined and monitored

Best Practice State(s): Florida, Massachusetts, Mississippi

Links to Comprehensive Education Information System Requirements and No Child Left Behind: All Components

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark **(an example of a "best practice" process**

- **Who or what group has oversight responsibility for the data management activities of the state department of education?**
  - A designated administrator and/or appointed group has the responsibility to oversee all aspects of data management.

- **With what other agencies will the department exchange data?**
  - Exchange agreements are in place specifying the content and conditions under which data are exchanged.

- **How are data collections approved?**
  - A formal submission for review and approval process is implemented and overseen by the oversight group.

- **What is the scope and purpose of data management activities?**
  - The oversight group has adopted or recommended for adoption by a higher individual or group a clear statement of the scope, purposes, and use of the organization's data.

Discussion:

Effective data management requires a focus of resources on clearly defined functions. This is achieved through the oversight and advice of groups of stakeholders. At the highest level, the WISE Data System Standards and Policy Advisory Group, persons who understand what the organization needs from its data and have the authority to advise decision makers, can provide the necessary oversight of management activities and effectiveness. The WISE Data System Standards and Policy Advisory Group should meet bi-monthly to

review policy issues and standards, and to make recommendations to WDE for adoption or submission to the legislative process as appropriate. This group should include broad representation of high-level people with policy expertise such as representatives from the districts, schools, the Legislature, WDE, a professional educator association, and other agencies. This policy group should provide guidance for how dollars will be distributed to districts and to consortia for implementation. The Standards and System Policy Advisory Group should adopt a charter for the WISE Data System and establish both short-term and long-term goals and objectives.

In Florida, Massachusetts, and Mississippi, steering groups and advisory groups were formed and relied upon during both the initial planning stages and during major change periods. However, all three states made these groups relatively inactive after implementation stabilized. The groups were reconstituted when major changes were being proposed.

USED has recently established the Information Management Working Group to review and recommend data standards to the Secretary of Education.
The USED follows a very formal review and approval process. A prospective data collector submits a proposed collection to the Office of the Chief Information Officer. After review for redundancies and compliance with USED standards, the proposed collection is submitted to their oversight group, the Office of Management and Budget for approval.

Reference:

- *State Education Agency Information Standards and Requirements*

Characteristic: Management

What staff and responsibilities are necessary

Best Practice State(s): Florida

Links to Comprehensive Education Information System Requirements and No Child Left Behind: All Components

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **Who or what office has primary responsibility for the management of data within the department of education?**
  - A designated person or office has the responsibility for the management (or delegation of the management) of all data. A single point of contact is designated for all issues related to data management.
- **What qualifications should the management staff have?**
  - Management staff are trained and experienced in data management, technology, administration, and public education.
- **What organization plan provides the best use and supervision of data management staff?**
  - The organizational plan provides data management staff with the technical supervision required while maintaining a close working relationship with the authoritative data sources.
- **How will the data management staff be incentivised to remain in the department?**
  - Professional development opportunities are provided to staff to remain current with technology and departmental priorities. Staff are involved in departmental activities beyond data management.
- **How will data providers and users know the schedule for key activities?**
  - An annual calendar is published with key dates for data submissions and availability.

- **What will guide the data management staff's on-going activities?**
    - The data management staff work from an annual plan with benchmark dates and deliverables.
- **How will the compatibility of users' workstations and software tools be ensured?**
    - The department has a common or compatible configuration for workstations, operating systems, and software tools to ensure that all users can access and process data as needed.

Discussion:

Management styles are individual to the state education agencies. Because of the need for objectivity, independence, and integrity for the data collected and reported, data management offices often report to the chief state school officer or a deputy (e.g., CIO or business manager) other than the one responsible for the programs that are to be held accountable with the data. The data management staff in Florida are experienced and tenured because they receive competitive salaries and have considerable independence in their activities. Staff in other states have higher turn-over rates and draw their motivation from being contributors to the public education enterprise.

Good management practices apply to the data management staff as well as to all other administrators. The best-practice states have staffed their data management offices with personnel with a wide range of backgrounds including instruction and instructional technology. Project plans, annual calendars, etc. are all necessary to manage the workload and the products.

States vary in whether or not the data management staff are combined with the programming/coding staff. Florida recently separated the duties and the staff in two units. Massachusetts recently combined the two under the same deputy commissioner. Mississippi has had data managers and programmers together since the beginning of their development cycle.

Our analysis of these varying staffing charts is that the fundamental dynamic that must be avoided is the isolation of the data managers from the information technologist (e.g., programmers/coders). Each needs to stay up-to-date with what the others are doing. Whether the data managers have programmers assigned directly to them in the line of authority or whether those programmers are in another unit to which the data managers must go for help is an issue with contrasting solutions across the states.

For WDE, the data managers must be able to perform some of their own analyses and have access to more sophisticated programming help as needed. As long as the data managers (acting in concert with the appropriate decision makers) influence the proper use of the data in the reporting process, who actually writes and runs the reports is less important.

Mississippi made an effort to include their programmers in the planning and design phases of their system in order to ease the transition from their former roles to the new roles they have with the automated systems.

Characteristic: Organizational Practices, Mandates, and Policy

How principles and policies are determined and monitored

Best Practice State(s): Florida, Massachusetts, Mississippi

Links to Comprehensive Education Information System Requirements and No Child Left Behind: All Components

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **Who must provide data?**
  - A policy is in place describing who must provide data, under what authority, and the consequences for noncompliance.
- **What federal laws, regulations, or grant requirements must be met?**
  - Departmental regulations and procedures are compliant with all applicable federal mandates.
- **What state laws, regulations, or grant requirements must be met?**
  - Departmental regulations and procedures are compliant with all applicable state mandates.
- **What state education policies, regulations, or guidelines must be followed?**
  - State board of education policies, regulations, and guidelines are up-to-date and comprehensive.
- **What state department of education procedures must be followed?**
  - State department of education policies, regulations, and guidelines are up-to-date and comprehensive.

- **How are enforcement, appeals, or exceptions handled?**
    - Administrative procedures that are compliant with laws, policies, and regulations are in place to prevent, detect, and respond to noncompliance with policies, regulations, or procedures.

Discussion:

Data must be managed within the constraints of all applicable laws and policies. Florida, Massachusetts, and Mississippi all followed state legislative mandates and funding bills when designing their information systems. These states were able to require participation by the data providers and to enforce their deadlines because of the authority (and priority = funding) attached to the data.

There is no substitute when a dispute or problem arises for well-documented departmental procedures. Professional standards alone may be unenforceable when problems arise.

Characteristic: Data Standards

How data elements are defined

Best Practice State(s): Florida, Massachusetts, Mississippi

Links to Comprehensive Education Information System Requirements and No Child Left Behind: Academic Standards, Student Performance Measures, Data Standards

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **What national or industry data standards should be adopted and followed?**
  - Standards for education data are periodically reviewed for their applicability to the agency's data management. A current list of standards is maintained by the department.
- **What state government standards must or should be followed?**
  - Standards for state data are periodically reviewed for their applicability to the agency's data management. A current list of standards is maintained by the department.
- **What are the adopted department of education data standards?**
  - The department maintains a meta-data dictionary of adopted data elements, definitions, code sets, related national/state standards, related mandates, and related collections and authoritative data sources.
  - Each data element is described with a definition, code set if applicable, field type, field length, requirement level (e.g., required, conditional, optional), entities, and periodicity (i.e., the time period measured and the frequency of collection).
- **How will all the data elements needed be identified and defined?**
  - Existing, approved data collections are analyzed to define the data elements they collect. Existing reports are analyzed to define the statistics they report. Future data needs are determined. The

advisory groups and oversight group follow the change management process to adopt elements.

- **What data model will be followed to organize the tables and files?**
    - A logical data model is developed to illustrate the relationships among the data within the database.
    - A physical data model is developed to detail the actual table structures within the database.
- **How will changes in data definitions and formats be managed to maintain historical views?**
    - The meta-data dictionary will track historical definitions, code sets, and characteristics to allow for crosswalks and translations as required.
- **What entities need to be linked across data files?**
    - The data management system is able to match records across these data files: students, staff, financial, facilities, programs, and others as identified by the oversight group.
- **How will these entities be linked?**
    - Unique, permanent identifiers are assigned to students, staff, programs, locations (e.g., schools and districts), courses, and information sources.
- **What is the periodicity for each data element or statistic?**
    - The periodicity for collection and reporting of all official data and statistics is documented for all users of the data.

Discussion:

WDE has documented its data definitions well and provides that documentation on their web site. During this study for the WISE Data System, those elements from extant collections were matched to the elements required for conversion to individual student records. Then those were compared to SIF objects (adopted, draft, and in working groups).

National efforts coordinated by the National Center for Education Statistics and the Forum on Education Statistics have been on-going for over a decade. A

comprehensive summary of these activities and the resulting guidance they provide has been compiled by ESP for USED/OCIO.

References:

- *National Education Data Standardization Efforts*
- *Standards Group Meeting Notes*

Data definitions and formats should be developed with a school perspective in mind. Definitions and content standards should reflect how data are collected and reported from the schools and districts. A useful perspective on data elements that are applicable to a teacher has been described for the USED.

Reference:

- *Case Study of Classroom Data Needs*
  - *Information Needed on the First Day of School*
  - *Information Needed on a Daily Basis*
  - *Classroom Records Needed*

An education agency's data architecture should be designed to reflect how work is done within the agency, how audiences expect their information to be presented to them, and how education data are best defined for compatibility across agencies. There are several dimensions to a functional design. First, there are areas of work that make sense to think of when categorizing data files, e.g., finance, students, human resources, etc. Second, there are users that can be described by their needs and authorized access levels. Third, there are types of formats for the data that match the uses targeted, e.g., raw data, aggregate statistics, public research files, etc. Across all these dimensions are critical issues such as security, confidentiality, data quality, data standards, and identification codes. Together, the whole logical database design must be multidimensional to reflect the complexities of the organization and the users of the data.

The common characteristic of each best-practice state is the foundation of a well-conceived and constructed data dictionary, which describes in detail the definitions, codes, formats, and periodicities for each data element in the database. The data elements are organized into areas/categories, submission periods, entities described for both collection/submission purposes and storage in the database. A specific data architecture is described for the primary collection of individual student (or staff) data. These specifications document how this authoritative data source is formatted for access by all users.

Reference:

- *Meta-Data Dictionary Components*

Common data elements potentially can be consolidated or managed for collection and reporting across programs, departments, and other data collecting units. These common data elements can be categorized into four types.

- Identification Elements
  - Data elements that uniquely distinguish the reporting unit from others
- Classification Elements
  - Data elements that combine reporting units into meaningful groups
- Contact Elements
  - Data elements for contacting the organizational unit or the persons responsible for the unit
- Descriptive Elements
  - Data elements that describe key values for the reporting unit

All other data elements not considered as common by this classification are generally specific to a single or limited number of programs or organizational units.

This classification can be illustrated with a few examples.

- Identification Element: *School Name*
- Classification Element: *School Type*
- Contact Element: *Principal's Name*
- Descriptive Element: *Official Fall Membership Count*

Non-common data elements would include:

- *Enrollment in Title I*
- *Academically Disadvantaged Count for Program Eligibility*

These non-common data elements may be of general interest and use, but they are distinguished as being more specifically critical to a single or limited number of purposes. The key point is that non-common elements may also be shared

within the department. An exception would be an element whose nature makes it confidential or of no interest beyond the program collecting it. This element could be compartmentalized for that program. This classification is useful because it helps us to determine how to manage data elements.

The USED's data dictionary has been developed by ESP using the following process.

1. USED collections were catalogued and analyzed over six years. Unique data elements from across 900 collections were described and entered into the data dictionary.
2. Standards were catalogued and entered into the data dictionary as generic elements. Standards included the NCES student, staff, and financial data handbooks (See http://nces.ed.gov/index.html, the NCES home page, and search for handbooks under the publications menu item.)
3. Unique data elements (individual elements as they appear on actual collections) are linked to generic elements.
4. Consensus data elements are approved as standards to be used on all collections departmentwide. The consensus data elements are those for which a *de facto* standard for usage has developed over time.
5. Objects are created from elements that group together into meaningful sets.
6. Attachment sets are created from objects and elements that make up an attachment used with multiple collections.
7. Collections are created from elements, objects, and attachment sets.

Reference:

- *Anatomy of a Data Dictionary*

Florida's data dictionary predates the emergence of national education data standards. However, both Massachusetts and Mississippi used the NCES data handbooks and the SPEEDE/ExPRESS standard as a basis for their own data dictionary.

States are now watching the development of the Schools Interoperability Framework (SIF) standards, based upon XML, to see if they become an education industry standard. NCES, CCSSO, and a few other agencies have joined the software vendors in SIF. For a data architecture, the issue is whether to incorporate SIF/XML compatibility into the principles and standards adopted for data exchange.

Reference:

- *Summary of Meeting of Assessment Standards Groups*

Characteristic: Content

Which areas are included in the database

Best Practice State(s): Florida, Mississippi

Links to Comprehensive Education Information System Requirements and No Child Left Behind: Academic Standards, Student Performance Measures, Longitudinal Data Points, Course Data, Program Participation Data, Enrollment Data, Background and Demographic Data, Staff Data, Financial Data

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **What areas, categories, fields, domains, or types of data are managed within the information system?**
  - The content areas to be maintained are clearly specified by the oversight group and within the data dictionary. The content areas are aligned with the scope and responsibilities for data management.

- **What directory information will be shared across all users?**
  - Common directories are created and maintained to facilitate non-redundant collection of data and sharing of data for all uses. Directories provide contact information for students, staff, schools, districts, regional centers, programs, grants, etc.

Discussion:

Linking across areas within the database is a major added value that comes from effective data management of a comprehensive database. Connecting students to courses, assessment scores to instructional interventions, and teachers to certification and courses taught provides an increased return on the investment of resources and effort made by schools and other data providers. These connections across content areas make the whole of the data much greater than the sum of the parts.

A clear delineation of the content that will be in the database and the content that will not is necessary to manage resources and to match user expectations with reality. Directories are a key to collecting data once and using them many times. Directories are shared resources that ensure that identification and basic

descriptive information are current and the same for all users. Data providers can see the benefits to them of common directories because they reduce the number of times the same descriptive data are reported. Directories contain the key identifiers that allow for linking data across databases within the organization. The maintenance of these directories is a major responsibility of the data management staff.

The content for the WISE Data System was documented from extant data collections.

References:

- *Directories Required*
- *Entities Requiring Identifiers*

Florida's mature system has a wide range of content; whereas, both Massachusetts and Mississippi are expanding their content as implementation progresses. All states began with basic student data.

Content within a state database typically is included to meet these basic purposes at a minimum.

- To calculate state funding
- To comply with accountability systems
- To fulfill federal reporting requirements

The oversight and advisory groups should review and assist with the determination of the content.

No Child Left Behind adds a priority to the attention devoted to federal reporting mandates. Several key aspects from the law's provisions for adequate yearly progress determinations for schools and districts, for annual district report cards with school-level data, and other Title I indicators must be considered. Some examples of these are:

- Disaggregation of assessment results for
  - racial/ethnic categories
  - limited English proficient students
  - economically disadvantaged students
  - handicapped students
  - migrant students
  - males and females
- Separate analysis and reporting of proficiency in English/language arts and mathematics

- Annual determination and reporting of accountability ratings
- Classification of student performance as advanced, proficient, or basic in all areas
- Calculation of graduation rates for high school students
- Calculation of at least one additional indicator for elementary and middle school students
- Determining which teachers are highly qualified
- Counting classes without highly qualified teachers
- Identifying truant students and calculating truancy rates
- Determining which campuses are persistently dangerous

In order for the required reports to be generated from the database, the data elements for each of these statistics must be available at the required unit of analysis.

Reference:

- *No Child Left Behind Reporting Issues*

Characteristic: Data Quality

How data are guaranteed to be accurate and timely

Best Practice State(s): Florida, Mississippi

Links to Comprehensive Education Information System Requirements and No Child Left Behind: All Components

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **Who is the authoritative data source for each datum in the information system?**
  - The data dictionary identifies the person, program, or office that is responsible for the official data files for each area. All users of data in this area go to that authoritative data source rather than collecting duplicative or contradictory data.
- **How will data be entered or submitted to the system?**
  - Data collection and entry procedures are automated (web-based, client/server, or other application) with validation of users and entries. Prior to acceptance of data, the provider certifies the contents, and the system validates the format and range of the values (against past data or reasonable ranges).
- **What quality assurance steps must be followed by each authoritative data source?**
  - A quality assurance process is adopted and mandated for all authoritative data sources. See "Steps for Assuring Data Quality."
- **How are the data standards monitored and enforced?**
  - The oversight group monitors reports prepared by the designated management administrator.
- **What audit and edit processes are implemented?**
  - Standard audit routines are run against data files periodically to establish compliance.

Discussion:

Data quality is highest when:

- The data providers know what is expected.
  - Data standards are clearly specified and published.
  - Data collection and reporting processes are clearly described and training is provided.
- The data providers use the data themselves for their own work.
  - Data are collected directly from transactional systems.
  - Local information systems use the data first.
  - Data above and beyond what are useful are not collected and reported.
- Everyone, everywhere checks the data.
  - Data providers and users are accountable for accuracy, completeness, and timeliness.
  - Each person who handles the data verifies them before passing them along within the system.
- The data are available and used.
  - Data are reported publicly.
  - Accountability systems rely upon the data.
  - Value-added analyses and comparisons arise from the data.

These generalizations about data quality point out that a significant proportion of data quality is determined outside the departmental database, which is being managed by SEA staff. Again, data quality begins with clear data standards.

Within the SEA the authoritative data source must be identified for each datum. This makes one person/office responsible for the integrity and timeliness of the data. This allows the authoritative data source to be responsible for data quality.

The primary tactic cited by the best-practice states for ensuring data quality is making the data standards clear from the beginning. Then they audit to be sure.

Automated collections allow data to be validated upon entry into a field rather than waiting to run an edit check later.

Steps for Assuring Data Quality: This reference aligns the data quality standards developed by the USED for their program offices with the annual steps that an organization should follow to achieve quality data. Within WDE, these steps would apply to individual data and content areas. The reference provided was adapted for the Colorado Springs Public Schools.

Reference:

- *Data Quality Best Practice*

Characteristic: Support

How help is provided to users

Best Practice State(s): Florida, Mississippi

Links to Comprehensive Education Information System Requirements and No Child Left Behind: All Components

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **How will users be notified of and have access to the instructions, definitions, timelines, and other expectations for them?**
  - Users receive clear and comprehensive communications (either on paper or electronically) about how to use the information system and their responsibilities related to it.
- **How will users be trained?**
  - A training program is provided to all users. Certification for users is required as appropriate.
- **What level and type of support will users of the data need?**
  - A phone line or e-mail is available during regular business hours.
- **How do users know whom to call about what?**
  - Data management issues are delineated from technology or data collection issues for the users. Separate contacts are provided for each or a single contact directs calls to the appropriate person.
- **Who provides support to users of the data?**
  - A help desk or office functions to receive and process help requests.

Discussion:

Everyone trains the data providers—annually and on request. Training for data users is less stringent.

The Houston Public Schools train and certify their campus data clerks, and raised their pay accordingly.

A formal one-stop help desk is the goal, but not the reality for each state. Whatever the process, the users need to know where to get reliable responses to their problems. As with data quality, prevention, e.g., training, is the preferred approach.

Massachusetts had 10 data technicians supporting their 371 districts until recent budget cuts reduced the number to four technicians.

Characteristic: Resources

What is required to manage the data

Best Practice State(s): Florida, Mississippi

Links to Comprehensive Education Information System Requirements and No Child Left Behind: All Components

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **What types and levels of resources are required to build, modify, and maintain the data management activities and the information system?**
  - An annual budget provides staff positions and resources as required.

Discussion:

All three best-practice states had legislative support for developmental resources. The annual maintenance and operations budget supports Florida's and Mississippi's efforts; however, Massachusetts's data management budget has been reduced along with the overall departmental budget.

Characteristic: Response to Change

How growth and changes are accommodated

Best Practice State(s): (Florida, Massachusetts, Mississippi)

Links to Comprehensive Education Information System Requirements and No Child Left Behind: All Components

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **What process manages change?**
  - A change request process is in place. The management person or office handles the requests promptly. As appropriate, the oversight group or the management office takes appropriate action.

- **How will the information system and the adopted management processes grow as the scale of data tasks increase?**
  - A long-range plan for growth is adopted that envisions how growth will be accommodated.

Discussion:

The changes discussed here are not minor modifications, but changes to content, reporting, access, or another aspect that have a major impact. The data architecture should be designed to accommodate these changes.

Each of the three best-practice states demonstrated the viability of their data standards and information systems in their response to No Child Left Behind's requirements. Because each collects and maintains within their central databases individual student records containing the required data elements for demographics and programs, responding to No Child Left Behind's changes became mostly a matter of changes in analysis and reporting.

The major challenge each state is facing is how to reduce the cycle time for scoring and reporting assessments to meet the No Child Left Behind requirement of reporting at the beginning of the school year. This challenge again points out the need for data to be managed before they reach the SEA.

Characteristic: Output and Products

How users see the data

Best Practice State(s): (Florida, Massachusetts, Mississippi)

Links to Comprehensive Education Information System Requirements and No Child Left Behind: Academic Standards, Student Performance Measures, Actionable Accountability Reports, Actionable Diagnostic Reports

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **How do users of the data access the data?**
  - Reports and data files are available both electronically or printed as appropriate.
- **What dimensions of reporting must be supported?**
  - The information system supports reporting for federal mandates, grants, other state agencies, the state education board, department management, program management, school and district value-added reporting, public reporting, research, and information system monitoring.
- **What standard reports are published?**
  - A listing of reports and their publication dates is produced and available electronically and printed.
- **How will the school and district providers of the data see a return of value-added analyses and reports?**
  - User groups representing the data providers assist in the development of reports or reporting processes that return reports with analyses and relationships beyond those schools and districts can produce.
- **What decision support system will be provided?**
  - A decision support system is in place to provide data to decision makers in a timely and usable manner.

- **How will the reliability of the data be determined prior to reporting?**
    - The SEA has a rule in place that sets a minimum number of individuals in a group before their values are reported.

Discussion:

Outputs and products are generated by the data system for the users. This is different from access to the database. A hybrid example would be data in a data warehouse or data available to a decision support system.

Unfortunately, even the best-practice states, which carefully documented the basic reports that would be required from their databases, did not anticipate the broad and varied types of standard reports for which a demand would grow over time. The response to this has been to use report generation tools to make custom reports easier to produce.

No Child Left Behind has emphasized the requirement to determine the statistical reliability of a performance indicator before publishing it for a small group.

Reference:

- *Reliability n*

At every level, the issue of missing data looms large. How blanks, zeroes, and invalid values are handled may not even be fully realized by the staff preparing submissions and reports. Some states and the USED "impute" values when data are missing. This means that a reasonable placeholder value is inserted in the blank field. Typically a prior year's value or an average value across years or entities is used. This technique allows totals and averages to be calculated, and comparisons to be made across entities and years. Whenever values are imputed, they should be clearly flagged to alert the reader. In fact, imputation is uncommon at the LEA and SEA level.

Characteristic: Response to *ad hoc* Demands

How new demands are handled

Best Practice State(s): Massachusetts

Links to Comprehensive Education Information System Requirements and No Child Left Behind: All Components

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **What ad hoc demands can be anticipated?**
  - The oversight and advisory groups provide expectations for requests and guidance on the appropriateness of responses.
- **How must responses be managed?**
  - A formal request and approval process is in place that is managed by the person or office managing the information and authorized by the oversight group. This includes requests for research by outside individuals and organizations.

Discussion:

WDE uses an Oracle database and Oracle query tools for ad hoc analyses and reports.

Ad hoc demands fall outside the range of standard reports and even any query or decision support system capabilities. The oversight group can provide guidance on unusual or controversial requests. Confidentiality must be considered.

Analysis tools are a major component in SEAs' responses to ad hoc requests. Florida reported providing Access and Excel files to offices for their own analyses. Massachusetts does the same, with users taking advantage of a wider variety of analysis tools such as SAS and SPSS. Mississippi handles ad hoc requests by assigning them to their own programmers.

Characteristic: Confidentiality and Security

How data are protected

Best Practice State(s): Florida, Massachusetts, Mississippi

Links to Comprehensive Education Information System Requirements and No Child Left Behind: All Components

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **What access to the data is required by each user type?**
  - An authority table is maintained that clearly describes each user type (or individual) and its access to data. As appropriate, individuals are authorized.
- **What minimum group size will be required before values for small groups are reported publicly?**
  - The SEA has established a minimum group size that ensures that personally identifiable information is not revealed in a report.
- **How can the physical components of the information system be secured from damage or loss?**
  - A security plan has been developed and is updated at least twice a year.

Discussion:

These two issues are often combined, but they are actually very different in most respects. They share the need to keep unauthorized people away from the data. The data architecture must contain tables and elements as necessary to identify each potential user and assign a level of access for each part of the database.

Confidentiality is most important in the public reporting of data. The SEA must have a decision rule that establishes the minimum number of individuals that must be in a group to allow reporting without revealing personally identifiable information that is protected under federal or state law. Techniques are available for making or reporting ranges when actual values cannot be reported.

References:

- *Protecting the Confidentiality of Education Records in State Databases*
- *Confidentiality n*

The following draft data access and use policy has been drafted as a starting point for the WISE Data System and WDE.

Confidentiality Background Reference for Wyoming

Data Access and Management Policy--*Sample Policy Statement*

The following text is adapted from statements drafted in Michigan, Virginia, Nebraska, and Oklahoma. Some references will need to be updated for Wyoming.

This policy statement pertains to the student information system containing individual student records that will be used for the purpose of collecting data needed for state and federal reporting, including School-based Teacher Led Assessment and Reporting System (STARS), state aid, special education, and the federal *No Child Left Behind Act*. The education information system will be managed by the WDE in accordance with Wyoming law and the federal Family Educational Rights and Privacy Act (FERPA). This policy statement contains information about the procedures that will be used to ensure the confidentiality of student records maintained in the student information system. It does not expand or in any way change the allowable uses by staff of the student information system or the availability of the student records to any other educator or member of the public.

The student information system is intended to support better decision-making and policies for improving the performance of students and schools, reduce reporting burden (ultimately), help to facilitate the entry of students into a new district, and ensure that timely, high quality data are available to legitimate users.

The student records system will contain data on all Wyoming students in public schools in prekindergarten and kindergarten programs, grades one through twelve, and all students receiving services through age 21. The database will maintain minimal data about student participation in state and Federal programs for which reporting is required, including information about English language learners and students in migrant, Title I, special education and career/technology (vocational) education. State assessment data will be maintained in this database. Links to postsecondary education records may be possible.

Data will be collected periodically in a prescribed format. The data elements collected will reflect a consensus on what is needed for reporting and decision-making and be based on what is considered best practice as identified by national education groups.

The student information system manager (on staff at WDE) will be the designated authority to establish and maintain a system of data protection for the student information system in accordance with the Family Educational Rights and Privacy Act (FERPA) and other relevant state and federal laws and regulations.

Definitions and Background to this Policy

Wyoming adheres to the confidentiality requirements in the Family Educational Rights and Privacy Act (FERPA), the Individuals with Disabilities Education Act (IDEA), and the Wyoming Public Records Law. The following definitions are derived from these and other related documents.

Privacy refers to an individual's right to freedom from intrusion due to disclosure of information without his or her consent. *Confidentiality* refers to an agency's obligation not to disclose or transmit information about individual students to unauthorized parties. Confidentiality consists of the measures used by an authorized agency to protect how personally identifiable information is collected and maintained and when consent by the student or his or her parent/guardian is required to release information. The Family Educational Rights and Privacy Act of 1974, as amended (FERPA, 34 CFR Part 99), the Individuals with Disabilities in Education Act (IDEA, 34 CFR §§ 300.127 and 300.560-300.576), and Wyoming statutes (insert) guard the confidentiality and access to students' educational records. All of these laws and policies are essential to maintaining the confidentiality of student records within the student information system.

Personally identifiable information generally includes, but is not limited to: the student's name; the name of the student's parent/guardian; the address of the student or student's family; a personal identifier, such as the state student identifier; personal characteristics or other information that would make the student's identity easily traceable. A small set of this information will be essential for assigning identifiers and for identifying students who have transferred from another district within the state or who have returned to the state who already have identifiers.

Disclosure means to permit access to, release, transfer, or otherwise communicate personally identifiable information contained in education records to any party, by any means, including oral, written, or electronic means.

Measures Used to Protect Confidentiality

To ensure the maintenance of confidentiality of the student records, this policy includes four privacy and confidentiality protections. These include assignment of a unique identifier, data security, restricted access, and statistical disclosure.

1. ***Assignment of a unique number***, called the Wyoming Student Registration Identifier, will help to protect the confidentiality of individual student records in the student information system. The Student Registration ID will be computer generated and contain no embedded meaning, and after being checked for

duplicates, will become permanent. Duplicates will be reconciled using a set of information , such as the first name, last name, date of birth, gender, race/ethnicity, parent/guardian name, and Social Security Number (if available) of the student. Once the student records are submitted to the WDE, the identifier will be removed or encrypted. Use of the encrypted ID in data bases along with the suppression of student names will make it more difficult for approved users to inappropriately identify specific students in the database.

2. ***Security*** includes the technical measures put into place by the State of Wyoming to ensure that records are not lost, stolen, vandalized, illegally accessed, or otherwise rendered useless. Since the data are stored on computers, it is essential that there be a high level of protection that provides integrity and availability commensurate with the level of risk and magnitude of harm. Procedures that will be used include secure firewalls and secure socket layers.

3. ***Restricted access*** to the data is imposed by this policy and is implemented by the student information system manager. It significantly limits who will be able to view the data and for what purposes. The student information system has three access levels, which are described below. Each of the levels is consistent with a specific educational purpose as defined in Section 99.31 of FERPA.

4. The student information system will produce summary reports from individual data that relate to groups of students, rather than to single individuals. While it may seem that the use of anonymous aggregated data poses little threat to confidentiality, there are some cases where populations may include only a few individuals. Statistical disclosure is the risk that arises when a population is so narrowly defined that tabulations are apt to produce a reported number small enough to permit the identification of a single individual. In such cases, the student information system manager will apply ***statistical cutoff procedures*** to ensure that confidentiality is maintained. For instance, in a search of the state assessment scores of Native American students, a particular school might reveal information about just two students. A possibility of inadvertently reporting personally identifiable information about these students is eliminated as described below.

Access to Data in the Student Information System

It is useful to think of a single record of an individual student as a folder that contains many pieces of information, such as name, school building number, gender, or date of birth, etc. These are called fields. Every field in the student information system is assigned an access level between 1 and 3, with Level 1 being the highest level. All access levels are assigned in a way that maximizes usage by educators without risking inappropriate disclosure of personally identifiable information.

Level 1 Access allows authorized WDE staff to read and write to all the records and fields in the database. This level is only permitted to a minimal number of authorized staff members who operate or manage the database or are responsible for maintaining the accuracy, security, and audit corrections in the performance of their duties. Authorization by the student information system manager will be required for this level of access.

Level 2 Access places limits on access to individual records but not fields. Specifically, superintendents (or their designees) of local school districts will have read-and-resubmit access to records of their own students. Another way to say this is that a superintendent may see all of the fields (data) collected about any of the students in his or her school district and can direct that data be resubmitted if errors are identified.

Level 3 Access provides school principals (or their designees) with access to data about their students for the current and previous years. This is a proposed function of the system that would allow comparisons of student scores and other data across school years and school districts for use in decision making about instructional improvements. In addition, this level of access would allow principals to obtain information about the performance of their former students who have gone on to postsecondary education, should this arrangement be available.

Level 4 Access gives read only access to a limited set of fields for all students within the state. The purpose of this level is to allow designated district personnel who are responsible for registering new students to determine a student's ID through use of a student locator system. Information that could help to better place a new student for instruction may be included. This is consistent with FERPA Section 99.31(a)(2).

Some WDE staff responsible for audits, operations, accreditation, and reporting to state and federal government agencies will have access to a limited set of fields, excluding student names. The fields that are available at level 3 will be specified in an Appendix once they are identified.

In the future, if the WDE develops an online decision analysis system, ***public read-only access*** may be made available to the general public, including educational associations, media, real estate agents, businesses, interest groups, etc., to view standard reports and data tables that are produced and published in aggregated formats on the Web, such as the data now provided in the online Wyoming Department of Education site. Data on individual students **will not** be accessed by anyone at this read-only level.

It is possible that some of the reports available through public read-only access would be based on a very small population of students or educational personnel, which could reveal information about the individuals in that group. For instance, if a search were done for the math scores of all Asian/Pacific Islanders, and this search revealed two students in a particular building, there would be some certainty that information about an individual could be disclosed. Therefore, the student information system manager will block any

aggregate results with a statistical cutoff in which fewer than **ten** students might be disclosed.

Release of Data to Researchers and Other Agencies

According to FERPA, personally identifiable information about students may be released without parental permission to researchers authorized to conduct data processing or research and evaluation studies. In addition, the WDE may want to work with the Wyoming postsecondary institutions to determine the success of students as they move from high school to postsecondary education and to track the successful placement of students who graduated with a concentration in career/technical programs. Authorization at this level is for the sole purpose of increasing the existing body of knowledge about Wyoming education. Researchers must submit to the student information system manager a written request for permission to have access to personally identifiable data that explains the purpose of the research study and how the researchers will ensure data confidentiality and security. This request will be considered on a case-by-case basis to determine if the request is in accordance with the Wyoming Public Records Law, the Wyoming Open Records Act and FERPA. The release of student data to researchers outside the agency is considered a loan of data (i.e., the recipients do not have ownership of the data). Researchers will be required to destroy the data once the research is completed.

Data access provisions may change if mandated by federal statute, state law, or administrative rules.

Disclosure of Data

A key purpose of the student information system is to provide access to statistical information that improves the education-related decisions of teachers, administrators, policymakers, parents, and other education stakeholders as well as the general public.

Private or confidential data on an individual shall not be created, collected, stored, used, maintained, or disseminated by the student information system in violation of federal or state law and shall not be used for any purpose other than those already stated in the student information system data dictionary or by agreement with companies that provide student assessment data. If the student information system manager enters into a contract with a private individual or third party to perform any of the student information system manager functions, that agreement shall require that the data be protected in the same fashion.

Under this Policy, no private or confidential data will be released except under the following circumstances as stated in 34 CFR Part 99 Final Regulations for FERPA:

1. To teachers and officials of the district when the determination has been made that there are legitimate educational interests, under Section 99.31(a)(1).

2. To school and district personnel when a student is seeking to enroll, under Section 99.31(a)(2).
3. To comply with a subpoena or court order, under Section 99.31(a)(9).
4. To honor a request from a judicial order, or an authorized law enforcement unit, or lawfully issued subpoena, under Section 99.31(a)(9)(i). A law enforcement unit refers to all state and local prosecution authorities, all state and local law enforcement agencies, the Department of Corrections, and probation officers who re part of the Judiciary.
5. To educational officials in connection with an audit or evaluation of a federal or state supported education program, under Section 99.32(c)(3).
6. To appropriate parties in connection with an emergency if such knowledge is necessary to protect the health and safety of the student or other individuals, under Section 99.36(a). In cases of health or safety emergency, the request for release must first be directed to the school district that owns the data. The student information system manager, under Section 99.36(a), may also convene a committee to evaluate the request to determine whether or not the person who would receive the information is in a position to deal with the emergency and the extent to which time is of the essence.
7. To researchers whose proposals are approved by the student information system manager, when a clear legitimate educational interest is established, provided that personally identifiable information if discovered is not disclosed to anyone other than the initiator of the request and the student information system manager. A determination of legitimate educational interest is based in part on whether sharing information on a specific person would unfavorably affect that individual's ability to learn and function in the classroom. [Section 99.31(a)(6) of FERPA]

Data will be disclosed only on the conditions that: (1) the party to whom the data are released does not disclose the information to any third party without the prior written consent of the student information system manager, the company who provided the student assessment data (if assessment data are being disclosed), or the school district that owns the data; (2) only when the data are protected in a manner that does not permit the personal identification of an individual by anyone except the party referenced in the disclosure; and (3) the data are destroyed when no longer needed for the purposes under which the disclosure was granted.

ADD WYOMING CITATIONS HERE

The student information system manager will account for all disclosures. This includes keeping a list of the data, nature, and purposes of the disclosure, and to whom the disclosure was made.

Improper Disclosure of Student Records

The student records system manager has the responsibility for determining whether a request for access to the student records constitutes a legitimate request for an appropriate usage of student data. If the request does not meet standards established by WDE for the appropriate release of student data, then the student records system manager will deny the request.

The student records system manager is also responsible for determining if personally identifiable information has been inappropriately disclosed by a Wyoming official or a third party allowed use of the data in violation of this policy. If the disclosure is made by a Wyoming official in violation of Sections 84-712, 84-712.01, and 84-712.03 to 84-712.08, then the official may be subject to removal or impeachment and in addition deemed guilty of a Class III misdemeanor. If an improper disclosure is made by someone other than a Wyoming official, then the parties will not have access to any student information system data for five years as required by FERPA. In addition, all violations will be reported to the appropriate federal and state enforcement agencies.

Destruction of Data

All individual data in the student information system will be kept for the length of time required by Wyoming law, which is at least XX years for data related to students. Data will be active in the student information system for **XX** years in addition to longitudinal data that shall be archived for **XX** years. Data that are no longer needed will be destroyed in a manner that protects the privacy and the confidentiality of the individuals involved.

Requests for Data Access

Upon the request of any individual (or the individual's parent/guardian if the individual is under the age of eighteen) under Section 99.20 of FERPA to gain access to his/her (child's) record contained in the student information system, the student information system manager will provide a copy of all or any portion in a comprehensible form and will consider requests to amend the record. Since the data actually belong to the local education agencies, parents/guardians should seek first to review and amend the student's record through the local education agency.

Unauthorized persons must contact the local education agency to obtain access to personally identifiable student data. They are required to obtain parental permission to obtain access from the local education agency as noted in FERPA.

The student information system manager may receive requests from researchers, education groups, and other parties who express legitimate education interests in the data as stated under Section 99.31(a)(1) of FERPA. The specification of what constitutes a legitimate educational interest will be described in the *Human Subject Review* agreement [**to be developed]**.

The student information system manager may grant such requests for educational purposes, if privacy, confidentiality, and security are ensured. There may be times when an interested party is involved with a unique population of students and may request access to names and addresses of students. For example, one may wish to conduct further survey research or interviews. The student information system manager cannot fulfill these requests. Furthermore, interested parties may request access to large volumes of data from the student information system. These requests may involve additional review by the administrator to ensure that processing the request does not degrade the efficiency of the system.

All users of the requested data must sign a *Human Subject Review* agreement that explains how the data are to be stored, used, maintained, and disseminated. If permission is granted, the student information system manager shall receive a copy of any analysis or reports created with the student information system data.

Ownership of the Data

School districts or other primary sources of the data that are located in the student information system are the originators and owners of those data. The student information system manager functions as the custodian of the data in the WDE. In order to protect the data in its custody, the WDE has established this policy which is implemented by the student information system manager. The policy ensures that all data are securely maintained with safeguards on all personally identifiable information in the student information system.

Parents will be given the opportunity to decline the release of the directory information to the WDE at the beginning of the school year. The student's name will be included in the locator system, but other relevant data will be suppressed and unavailable to the person responsible for registering the student. District staff will be required to contact WDE staff directly to determine if that student has a Student Registration ID and to get an ID assigned if one does not exist.

Characteristic: Data Exchange and Access

How data come in and go out

Best Practice State(s): Florida, Massachusetts

Links to Comprehensive Education Information System Requirements and No Child Left Behind: Automated Data Collection Systems, Authority to Access Data and Reports, Electronic Exchange of Student Records

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **How will providers and users of the data exchange them?**
  - A network architecture is in place to support the exchange of data and access to files.
- **How will data be exchanged across agencies, e.g., other state governmental agencies, postsecondary institutions, etc.?**
  - See Oversight. Standards are followed that allow the exchange of data across applications (e.g., ASCII/CSV, Schools Interoperability Framework/XML).
- **What levels of access will be allowed to the data?**
  - For each data file, the levels of access are identified for viewing, copying, editing, updating/appending, or reconfiguring.
- **What authority will be authorized for each user type or individual?**
  - An authority table is maintained for each file specifying which level of access is provided to each identified user group or individual.
- **How will data be exchanged across applications? (Including submissions of data from schools and districts to the department)**
  - Standards are followed that allow the exchange of data across applications (e.g., ASCII/CSV, Schools Interoperability Framework/XML).

Discussion:

Data exchange and access cannot be separated from confidentiality and security issues. Data management processes must describe how users will be identified and how each file or application will provide only the appropriate access to each user.

The exchange of data across agencies must be considered in the data architecture. Masking or suppression routines (if appropriate) should be implemented when confidential data are part of a file being shared. XML, as used by SIF, is providing a common format for data exchange just as ASCII files have for years. Although SIF has models for exchanging data transactions, additional protocols will need to be developed for large batch file exchanges. These standards are being developed with the assistance of the NCES and CCSSO representatives on SIF working groups.

A graphical representation of how data are shared across the various levels of the education enterprise is provided in the following reference. An example of a single data element (school type) as it moves across these levels has also been developed.

References:

- *Data Sharing across Levels of the Education Enterprise*
- *Data Linkages across Levels of the Education Enterprise*
- *Levels of Access*

Characteristic: User Engagement

How users are satisfied

Best Practice State(s): (Florida, Massachusetts, Mississippi)

Links to Comprehensive Education Information System Requirements and No Child Left Behind: Academic Standards, Actionable Accountability Reports, Actionable Diagnostic Reports

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **Which stakeholders should be involved in decisions about data management?**
  - The oversight group directs the manager to involve stakeholder groups.
- **What advisory group(s) functions to represent the users' needs and issues?**
  - Advisory groups function to represent all stakeholder groups identified by the oversight group.
- **What process is in place to pilot/field test modifications prior to implementation?**
  - The manager works with advisory groups to field test modifications prior to implementation.

Discussion:

The best-practice states relied upon advisory groups of users to establish early and lasting acceptance and commitment to the data standards. A standard practice has been to give schools and districts notice of changes in data standards, and to field test them prior to official collection. This is crucial because local systems purchased from a vendor do not adapt to changes quickly. Vendors may be slow to make adaptations for a single state (even the largest one). This is why standards such as XML/SIF have potential for providing common exchange standards that will ease the process of accommodating changes.

Characteristic: Data Storage

Where data are kept

Best Practice State(s): Florida

Links to Comprehensive Education Information System Requirements and No Child Left Behind: Linkable Individual Student Records, Longitudinal Data Points

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **How will data be organized and stored within the system?**
  - Raw data are stored in a normalized structure that is efficient and internally consistent. Pre-calculated statistics and data for queries are stored in a structure that is efficient and quick for access and analysis.

- **How will different file types be managed?**
  - The data management plan specifies the file types that will be allowed and maintained (e.g., raw data, analysis files, statistics files, and products) for each database. Rules are established for the creation and destruction of source files, working files, back-up files, and temporary files.

- **Will data be available for both snapshots and trends?**
  - Records for individuals and other entities are linked across files by unique, permanent identifiers. Linking is possible across files and across years and other time periods.

- **What unit of analysis will be maintained within the system?**
  - Data are stored at the lowest (most granular) level available for analysis to avoid losing details collected from the data providers. This includes individual student and staff records.

Discussion:

The definitions of data warehouse and decision support system vary across SEAs. However, in most cases these refer to a selected subset of data and

official statistics that are made available to users for query and analysis. The data architecture needs to associate with each element or data file a life span and destruction date. Data management practice should include guidelines for creating, maintaining, and destroying copies of files, and for permanent archiving of source files.

Terms used in describing data storage in a database and in the data dictionary are defined in the first reference below.

References:

- *Terms used with Database Systems*
- *File Types*
- *Salsa Scale for Granularity*

Data should always be stored at its original level of detail to allow analyses at the lowest possible level of granularity.

Data may need to be stored in both a normalized format for efficiency and in a less normalized format for faster analysis. OLAP cubes have become popular for speeding analysis, but they require that someone anticipate all the statistics and drill-down disaggregations that users will request.

General logical data models have been drafted for the OCIO/USED. These provide an excellent high-level view of the contents and relationships of data elements within a school, district, and state database.

Reference:

- *Education Data Models*
  - *School View*
  - *District View*
  - *State View*

Characteristic: Infrastructure

What must be in place

Best Practice State(s): Florida

Links to Comprehensive Education Information System Requirements and No Child Left Behind: Network Connectivity

- **Questions to Answer During the Planning and Design Phases**
  - Data Management Benchmark

- **What infrastructure is required to support data management?**
  - An information system architecture is in place that provides the infrastructure to support the features and functions required for data management within the overall information system.

Discussion: Although the infrastructure is not a data management responsibility, the data management staff must ensure that an adequate infrastructure is in place to support their activities. The organization should have an overall information systems architecture that establishes the principles and standards for hardware, software, and networks.